Assoc. Prof. Todor Nedev, PhD

IS THERE A MARKET FOR ELECTRIC ENERGY IN BULGARIA?

The specifics of trade in electric energy – in general and in particular the peculiarities and disproportions on the Bulgarian market are presented in this article, proving the need of an organized and functioning exchange market of electric energy and the need of its continuous transparent operation.

JEL: D 43; L 94; Q 41; Q 43

The price of electric energy in R. Bulgaria has always been a topical theme and a permanent reason for reflection for the businesses and the households as end consumers. The increasing bills for consumed electric energy prompt a lot of people of all shades of social, political and economic strata to think about the problems of the Bulgarian energy sector and their potential solutions.

Electric energy is a commodity consumed on a daily basis by each European. It is subject to commercial transactions as any other commodity, i.e. everyone wants to have it at home or at work, and someone must produce and deliver it to the end consumer. The specific point here is that electric energy cannot be stored, i.e. as soon as it is generated it must be consumed – it shall reach the end user. There is no way to use the electric energy produced yesterday in making the morning coffee today. Electric energy must be consumed at the time of its production. This is quite a complex technical task which, in general, should be resolved by the systems operator of the respective country.

The purpose of this study is neither to analyse the financial position of Bulgarian Energy Holding, the National Electric Company or other trade partners in electric energy on the territory of R. Bulgaria; nor to monitor the entire process of regulation of the Bulgarian market of electric energy; nor to comment and compare the positions of different producers of electric energy in Bulgaria nor the balancing opportunities (the technical problems of the Electric Energy System).

The legislative framework of the European Union for the electric energy market is embedded in Directive 2009/72/EC.[1], specifying the main actions and objectives to be observed by the member states:

- Main purpose: achievement of a '…*fully open market*, which allows all consumers to freely choose their supplier and all suppliers to deliver freely to their customers.'
- The full market opening *aims at separating generation from supply* of electric energy, enabling the creation of conditions of loyal competition and opportunities for market impact on the changes in electric energy price;
- The Directive requires *all the producers to be put on a level playing field competition-wise* in an objective, transparent and non-discriminatory manner, as well

[1] http://www.mi.government.bg/bg/library/direktiva-2009-72-eo-na-evropeiskiya-parlament-i-na-saveta - ot-13-yuli-2009

as that third-party access shall be provided to the transmission and distribution systems in conformity with the requirements for full market opening;

• Electric energy *production* is always regionally individualized. The maximum possible generation by all producers of electric energy is defined as the maximum capacity of such territory. The electric energy market in the US, for example, is divided up into 140 regions, respectively having 140 control points to measure the quantities of input and output electric energy for the region, sold, or purchased by another region, respectively. The possibilities of selling electric energy to another region are determined by the possibilities of energy transmission between the two regions (Hull, 2009, p. 713).

• *Electric energy transmission* shall take place only and solely via the power transmission grid – the totality of generation capacities, transmission lines, cable networks, transformers and other facilities that make it possible for electric energy from producers to reach its end consumers.

• The market of electric energy, like the market of other primary-energy sources, must be *transformed from a state monopoly to an efficient market* by means of appropriate regulations. 'This process is always accompanied with the establishment of a temporary for derivatives on contracts for supply of electric energy' (Hull, 2009, p. 714).

Characteristics of the Bulgarian electric energy market

As a result of the disproportions and contradictory rights and obligations superimposed with time on the players in the Bulgarian electric energy market and the issues, concerning the development of the energy sector and the trade in electricity in particular for the period 2006-2014 (Table 1), have been a topical and morbid to the Bulgarian society.

Table 1

Development of electric energy generation over the period 2006-2014

Indicator	Year								
	2006	2007	2008	2009	2010	2011	2012	2013	2014*
Gross production by PP to PTG [MWh]	45 710 000	43 093 000	44 831 000	42 573 000	46 260 000	50 070 000	47 195 000	43 650 000	45 699 802
Variation in %		*-5,7*	*4,0*	*-5,0*	*8,7*	*8,2*	*-5,7*	*-7,5*	*4,7*
Physical imports [MWh]	1 139 000	3 058 000	3 097 000	2 662 000	1 168 000	1 450 000	2 353 000	3 350 000	
Physical exports [MWh]	8 391 000	7 538 000	8 441 000	7 731 000	9 613 000	12 111 000	10 660 000	9 531 000	9 190 535
Variation in %		*-10,2*	*12,0*	*-8,4*	*24,3*	*26,0*	*-12,0*	*-10,6*	*-3,6*

Legend: PTG – Power Transmission Grid; PP – power plant; Physical imports – electric energy actually imported in the Republic of Bulgaria from neighbouring countries; Physical exports – electric energy actually imported electric energy actually exported from Republic of Bulgaria to neighbouring countries.

* Calculations for 2014 are based on operational data until 21.12.2014 from ESO-EAD.

Source. Electricity System Operator EAD.

Since September 2008 the Bulgarian government has been amalgamating the energy companies of Bulgaria into *Bulgarian Energy Holding (BEH)*, which includes NEK, Kozloduy NPP, Maritsa – East 2 TPP, Maritsa-East Mines, Bulgargaz, Bulgartransgaz and Bulgartel.

Annual production of electric energy over the period varies between 45 and 50 terawatt-hours (TWh) which is indicative of fluctuations in the yearly consumption under 10% compared to 2007. Yet the volatility of electric energy imports and exports is much higher, mainly due to the fees determined for transmission. (When more costs are included in the transmission fee, transport becomes impossible, an example presented by Romanian energy for Turkey.

Electric energy is supplied in R. Bulgaria only and solely via the power transmission grid of Electricity System Operator EAD, which became an independent state company within the framework of BEH in 2014.

Electric energy consumption is irregular during the different hours of the day and therefore the System Operator of the respective territory should temporarily disconnect particular producers[2] (the time of forced outage of capacity varies from several hours for HPP and TPP to 2-3 days for NPP, with at least the same time needed to put them back into generation mode), or to connect new capacities to the system as it must be balanced all the time – the generated capacity should always be equal to the consumed capacity. The classical example of balancing the electric energy system are hydropower plants which generate electricity in peak hours and then become consumers and start pumping the water back upwards so that it can be used again in the generation of electric energy.

The *main regulatory authority* is the State Energy and Water Regulatory Commission (SEWRC). In 2003, 13 general principles were stipulated in Art. 23 of the Energy Law (EL) to be observed by the Commission in performing their regulatory powers. Such principles are in full compliance with the requirements of European Directive 2009/72/EC, yet their application is usually accompanied by contradictory comments and opinions of various experts from the sector.

Contracts concluded in 2001 for long-term purchase of energy with Contour Global Maritsa East 3 and AES 3 with Maritsa East 1 EOOD make a provision that they will sell all their production to NEK at a price *guaranteeing the return of their investment for a period of 10 years.* It is noted in the SEWRC report that the total costs for 'non-generated energy' paid to the two power plants amounted to BGN 274 mln. for 2013 because there was no consumption in Bulgaria and the price of the generated electric energy is significantly higher and cannot be sold on neighbouring markets.'[3]

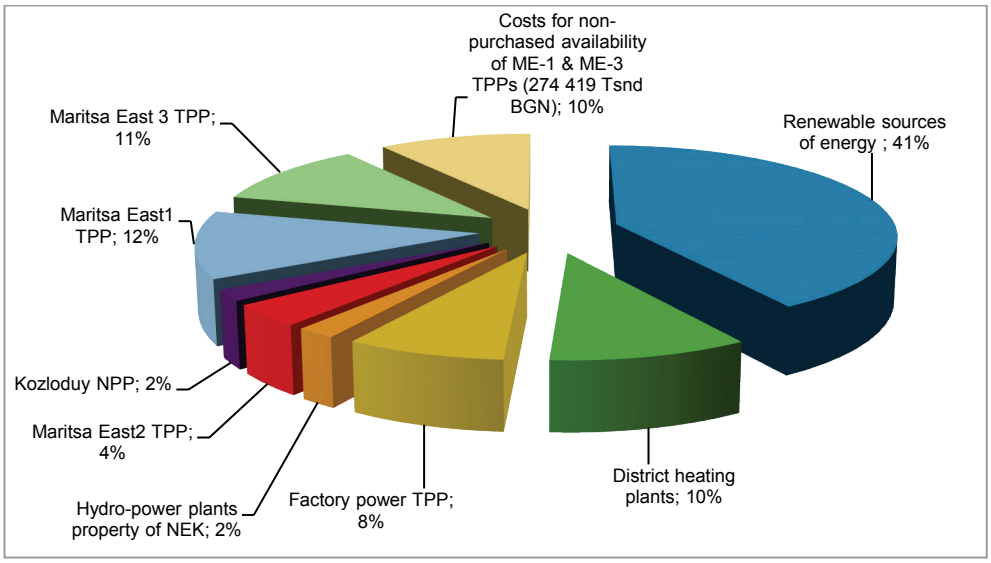
[2] The time for non voluntary disconnection of facilities is from several hours for HPP and TPP to 2-3 days for NPP, and approximately the same time is required to be put operation again.

[3] Cf. Price of electric energy in the regulated market during the new price period 1.07.2014-30.06.2015' http://www.dker.bg/NPDOCS/el_prices_2014-15.pdf (29.05.2014).

Although the methodology of comparison of costs is not explained it is evident that the costs of Kozloduy NPP are 2% and for producers from renewable energy sources the costs are 41%, that is, a difference of more than 20 times is outlined in their costs.

Figure

Structure of costs for electric energy from producers under the long-term contracts effective until now



The Annual Report of SEWRC for the European Commission dated July 2014 states, that 'Apart from the condition to purchase almost the entire quantity of available capacity from the two power plants, influence is also rendered by the high purchase prices of availability and energy paid by NEK EAD. The prices of generated electric energy are by 54% (for Contour Maritsa East 3 AD) and 120% (for AES 3C Maritsa East 1 EOOD) higher, respectively, than the average price of electric energy from the other TPP selling electric energy on a regulated market. (p. 30).

The main large consumers of electric energy, i.e. those selling to the end consumers are the three power distribution enterprises – EVN, CEZ and Energo-Pro, purchasing all the electric energy they need at a fixed price, *guaranteeing a profit of 8%* to them, in accordance with the regulations of SEWRC and the signed privatization contracts.

The differences in prices of individual producers are also specified by SEWRC and they are speaking in their own way when exemplifying the disproportions laid down in time:

Table 2

Prices of energy and availability of producers of electric energy for the regulated market

Producers	Price in BGN per MWh
Kozloduy NPP	30
Maritsa East 1 TPP	90,35
Maritsa East 2 TPP	68,30
Maritsa East 3 TPP Hydro-power plants property of NEK	70,88
factory power plants	128,65
district heating plants	183,46
renewable energy sources	299,05
hydro-power plants owned by the National Electric Company	63,64
Approved price for the National Electric Company as 'Public supplier'	*110,58*

The price of electric energy from the thermal power plants in Maritsa East is two to three times higher that that from NPP and this is mainly due to the commitment assumed for purchasing the entire quantity of electric energy produced by the two TPPs.

The National Electric Company (NEK) has the obligation of a 'public supplier' by virtue of Art. 93a of EL. '*The Public supplier shall purchase electric energy from producers connected to the transmission grid under contracts of long-term purchase of availability and electric energy, as well as energy generated from renewable sources, from highly efficient combined generation …*'. Most generally, public expectations are placed on the National Electric Company to deliver electric energy to all end consumers and to maintain 'fair' prices. In order to meet such expectations NEK purchases the cheap electric energy generated by Kozloduy NPP, covers the costs of availability and buys out the entire quantity of electric energy produced from renewable energy sources (RES). The price of the public supplier is thus obtained – 110.58 Levs for one Mega Watt hour (1 MWh) as shown in the drawing. It was increased from 01.07.2014 to 114.10 Levs per MWh, net of VAT, by SEWRC Decision No. Ц – 12 of 30.06.2014.

Another problem is the high price of electric energy from renewable energy sources, it being exactly *10 times higher* compared against that of NPP Kozloduy. For comparison - the addition included to the price for end consumers for renewable energy sources in Germany amounts to 5.3 Eurocents per kWh. (EPEX SPOT, 2013, p. 19.).

Control in the energy sector is vested to the Ministry of Economy, Energy and Tourism – MEET. (*Art. 75. (1) The Minister for economy, energy and tourism shall exercise preliminary, ongoing and subsequent control …*'). The embedded extensive disproportions however, and probably other lesser contradictions make the SEWRC, MEET and NEK implement new, higher and even more difficult to understand fees – for transmission, additions for green energy, *fee for non-*

recoverable investment costs, 'Public' fee, etc. Anyone having the opportunity of making use of the non-recoverable investment costs fee can spend a lot of money for nothing, because consumers of his service will pay all this again to the last cent. What other better opportunity there can exist for uncontrolled spending? It is nether motivated nor explained why each end consumer must pay for each Mega Watt of electric energy BGN 16.80 to NEK in 'Public' fee. What is being compensated with this and how?

Other disproportions are created by the increase in transmission fees. The Annual Report of SEWRC for the European Commission dated July 2014 states, that '*Until 31.07.2013 this model made provision for the obligations to the public to be included in the price for transmission. Over the past few years a lasting trend was marked towards increase in such costs and their level in the period 2012-2013 resulted in an exceptional increase in the total sum payable to the price of transmission, which actually blocked Bulgarian export of electric energy (p. 30).*

By its Decision N Л-422 dated 31.03.2014 SEWRC granted a license for the activity 'organization of a stock market of electric energy' for a term of 10 years to the state company – part of the Bulgarian Energy Holding (BEH) – Bulgarian Independent Energy Exchange EAD. This company will use the technical and material resources of Electricity System Operator EAD and for such purpose the system operator undertakes to separate, rehabilitate and provide the Organized Market 'Day forward' module, which has been part of the electric energy market in Bulgaria since 2010 until now. A Business Plan of Bulgarian Independent Energy Exchange EAD was presented for the period 2014-2018, wherein provision is made for starting the activity in 2014 and expansion in 2016 by purchasing a platform for 'market coupling' through which it will be possible to organize a stock market within the framework of the same day. It is envisaged to sell in 2014 on the stock market quantities a little over 4 TWh and in 2018 such quantity is expected to double – to 8.5 TWh. Provision is made for a fee for transactions on this exchange in the amount of 0.10 Levs per MWh. One can notice that the presented Business Plan is for 4 years and the License was granted for 10 years. An interest was also expressed by the private company 'Bulgarian Energy Exchange' which applied for the issuance of this license too, but it was not approved.

The following conclusions could be made from the statements above:

1. Even the most cursory analysis of practice during the past few years proves that there is no market of electric energy in Bulgaria. Each producer substantiates his costs before SEWRC. The Commission performs a 'detailed analysis of the information' (see the motivation to Decision N Ц-43/30.12.2013 by SEWRC, p. 9) and approves new prices for each producer including for NEK-EAD in its capacity as public supplier. This forces SEWRC, as a regulatory authority, to work in a vicious circle – pressure by producers to have higher costs approved wherefrom logically follow higher prices for the end consumers.

2. Electric energy producers are unequal and there are no initial signs of competition among them at all. Almost every producer of electric energy holds

some position of a natural monopoly (no matter if a government or a private entity) which guarantees to him an advantage over the others and this is included in the estimate of NEK-EAD for the approval of prices by SEWRC.

3. The establishment of Bulgarian Independent Energy Exchange EAD was just to be able to say that there exists an organized exchange market, because it does not affect the formation of prices.

Organization of the European Energy Exchange – EEX

A sector for sale of electric energy became operational in August 2000 with the Group of the German Exchange (Gruppe Deutsche Börse) in Frankfurt. The exchange is called European Energy Exchange – EEX. The structure of capital on the exchange was as follows: 52% - property of energy traders from Europe, owners of power transmission grids, banks etc. and the remaining 48% are property of Eurex – the largest forward market in the world.

Te cash market was started by 32 participants from 6 countries. This suggests the potential for the exchange to become a centre for trade in electric energy for Central Europe, and the intention was to turn it into e centre for trade in energy resources in Europe.

The forward market started on 01 March 2001 allowing physical supply of electric energy from the cash market to be bound with the possibilities for risk management through forward transactions under minimum transaction costs.

The exchange suggests a sufficient degree of transparency and full liquidity of deals made on the basis of perfect rules and the operation of a clearing corporation. There transactions are made with all primary-energy sources: electric energy, natural gas, coal, oil and harmful emission quotas.

Cash power exchange market – EPEX SPOT[4] unites the markets of France, Germany, Austria and Switzerland, representing together more than a third of electricity consumption in Europe. The market of these four countries was also joined by Italy, Spain, Czech Republic, Slovakia, Poland, Hungary, Greece and Romania. EPEX SPOT SE is responsible to the activity of the European Energy Exchange. The seat of the company is in Paris with offices in Leipzig, Bern and Vienna. It was established in 2008 based on the merger of the power exchanges Powernext SA of France and EEX AG in Germany. Its equity is equally divided between the two companies. The company is responsible for the activity of the European Energy Exchange. The company has a two-tier management system. Besides, two additional independent managing bodies have been established to guarantee that the rules of corporate governance are observed:

- the Market Surveillance is responsible for control, security and transparency of the market;

[4] A new record of 37,2 TWh as sales volume was registered in December 2014.

• the Exchange Council guarantees the adequacy of rules in the unified internal market.

The market monitoring body – (Handelsüberwachungsstelle), or Market Surveillance – is an independent member of the exchange, directly reporting to the managing board of the Exchange, playing an important role for the proper functioning of the market. It is constantly monitoring the operations on EPEX SPOT markets and verifies if Exchange members are infringing upon the rules of behaviour. Market Surveillance is the central institution for contact for all regulatory bodies associated with the trade in electric energy. The activities include preparation of analyses of market indicators and more in-depth investigations. In case of suspected breach upon the rules of the internal market the market surveillance is entitled to collect documents and information from members of the exchange and the beneficiaries in every transaction, including, in the event of a proven violation of market rules the Surveillance can make a decision for a sanction – suspension of membership, for example. It also contributes to maintaining fruitful relations with all supervisory bodies and energy regulators responsible for the European markets of electric energy.

The exchange mechanism allows the arrangement of offers as legally binding agreements for purchase or sale of a particular quantity of electric energy in a given zone, for supply at a particular price (the so-called market clearing price). Under the rules such price can never be higher that the purchase price fixed by the buyer or lower than the sale price quoted by the seller.

Completed deals on the exchange are forwarded immediately to the central counterparty for each transaction – the *European Commodity Clearing (ECC)*.[5] It is a central counterparty for all buyers and sellers who, as a rule, do not know each other. The clearing organization will always step in as a universal intermediary between buyer and seller, i.e. it provides for both the liabilities of buyer versus seller (payment for the electric energy), and for those of seller to buyer (the delivery of electricity). This clearing informs interested operators of transmission grids in the zones of supply, receives information on the actually transmitted energy and demands the money from the buyer in order to transfer them to the seller.

EPEX SPOT publishes daily exchange prices which are determined in a direct matching of demand and supply. As such transactions are the result of extensive, open and transparent competition between orders by members of the Exchange they reflect the best available information as at this point of time in the market environment.

Usually the cash market is organized 'a day ahead' and 'within the day'. Traded today on the '*a day ahead*' market are contracts with term of delivery tomorrow. Such contracts are called base contracts and provide for the supply of 1 MW/h per each astronomical hour of the day. There are contracts, however, which cover peak hours,

[5] http://www.ecc.de/ecc-en/

i.e. the time of peak consumption, sunny hours or hours without active consumption of electric energy. It is guaranteed on the cash market that the price is a real presentation of the momentary ratio between demand and supply of electric energy and is aimed at maximum approximation of electric energy prices to the equilibrium prices of electric energy at any point of time, i.e. the price shall always correspond to the momentary ratio between demand and supply.

On the '*intraday*' cash market trade is possible up to 45 minutes before the time of delivery, i.e. every trader on the exchange can buy or sell quantities of electric energy the supply of which will start within 45 minutes. Flexible Intraday Trading Scheme (FITS) is applied to provide new opportunities for cross-border trade between France, Germany, Austria and Switzerland. Therefore the proposed flexibility is welcome by the players in the market.

Furthermore, as of December 2011 it possible for the market of Germany and Austria *'15 minute'* contracts could be concluded, i.e. it is possible to purchase or sell electric energy during particular 15 minutes of the day. These contracts have been helping participants in the exchange trade to better cope with the fluctuations of peaks and drops in production, especially of green electric energy. The achieved ultimate result is better balancing of the market in a particular region. Right from the introduction of the 15-minutes contract its amount is 1 TWh. On whole, sales of such contracts represent about 10% of the volume of the German intraday market. . [6]

The EPEX SPOT cash market is integrated intraday as an effective solution also for the variable production of green energy as it enables producers and consumers to balance their portfolio closer to the moment of supply. This allows more accurate forecasting the demand and balancing the production, as Green energy is simply consumed at the time where there is no sunshine or winds are not blowing. When supply is possible to a larger region then the possibilities for the system operator to optimize consumption become greater irrespective of the inherent bigger losses from electric energy transmission over greater distances

The significance of renewable energy in Europe is growing. The 20/20/20 policy of the European Union is targeted at reducing noxious emissions by 20%, while the share of energy from renewable sources in the production of electric energy is expected to grow to 20% in 2020. Such growth is driven by a political, economic and ecological motivation thanks to the growing significance of renewable energy sources, including the production capacity for green power within the energy mix of Europe during the coming decades[7] (see Table 3).

[6] http://www.epexspot.com/de/erneuerbare_energien/integrierte_intraday_markte (17.04.2014)

[7] Germany has the largest market of green electric energy in EPEX SPOT – around 22% of the electric energy is currently from renewable energy sources. This share is expected to grow until 2020 to 35% and before 2050 to reach 80%.

Table 3

Installed capacity for generation of green energy

Generated by:	EU-27	France	Share, %	Germany	Share, %
Hydro power plants	120	25,4	21	4,4	4
Biomass	26	1,3	5	7,2	28
Wind	94	6,7	7	29,1	31
Solar	52,1	2,2	4	25	48
Geothermal	0,9	0	0	0	0
Total:	*293*	*35,5*	*12*	*65,7*	*22*

Source. Installierte Kapazität zur Grünstromerzeugung 2011. – In: GW Quellen: Eurelectric, BMU, RTE.

The most noticeable increase to date is in the solar and wind energy, which makes current energy markets to face considerable challenges. Green electric energy has specific technical characteristics and particularly problematic is its fluctuation depending on the rise or decrease of solar or wind energy. The electric energy market is in need of new more flexible solutions as not always when the sun shines or an optimum wind is blowing for generation of renewable electric energy there is a need of such energy.

The data from Table 3 show that 21% of the European HPPs operate in France and Germany possesses almost half of the solar plants in Europe and nearly a third of the European capacities for generation of electric energy from biomass and wind.

Over the past years the EPEX SPOT markets have proven their capacity to take in large quantities of renewable energy without any perceivable influence on the price of electric energy or increase in its volatility. The number of players on the cash market is continuously growing and at this point of time they are 236 firms from 24 countries, with licensed traders from Romania and Greece, inclusive.

Therefore the legitimate question will arise – why no Bulgarian participation on this market, despite the public statement, that Bulgaria will become an energy hub of the Balkans. In fact it could be said, that our country is not an isolated market any more.

The exchange market described thus schematically guarantees:

- fair and adequate behaviour of members of the Exchange, as players on an equal footing in the trade of electric energy;
- safe delivery and payment for the traded electric energy, i.e. guaranteed liquidity of the market;
- anonymity of transactions – producers do not know to whom they sell and buyers do not know from whom they will buy actually, i.e. there is no possibility for trading among related parties;
- transparency in determination and variation of the price in accordance with demand and supply for every moment of the day.

Term transactions (derivatives) for delivery of electric energy are particularly interesting. The sale of electricity on the day before its physical delivery and the conclusion of term transactions for supply in the future provide for accurate reporting of demand and supply, as well as for better risk management by making use of the specific potential of derivatives concerning electric energy. Each producer may choose to either sell at loss in a particular time zone or to accept the losses from a forced outage of its capacity because the system operator has nowhere to sell such electric energy owing to the fact that at this point of time no one is willing to buy and consume that quantity.

In line with the cash transactions also possible are three main types of term transactions on the European Energy Exchange.[8] On the term market futures are offered with physical delivery, financial futures and options. They feature a similar method of determining the price – in auction or an ongoing price fixation.

Traded on the European Energy Exchange are *futures with physical delivery* of electric energy for the territories of France, Belgium and Denmark, as follows:

- Belgian futures for base load (monthly, quarterly and yearly) - Belgian-Power-Baseload-Month/Quarter/Year-Futures;
- Danish futures for base load (monthly, quarterly and yearly) - Danish-Power-Baseload-Month/Quarter/Year-Futures;
- Danish futures for peak load (monthly, quarterly and yearly) - Danish-Power-Peakload-Month/Quarter/Year-Futures;
- French futures for base load (weekly, monthly, quarterly and yearly) - French-Power-Baseload-Week/Month/Quarter/Year-Futures;
- French futures for peak load (weekly, monthly, quarterly and yearly) - French-Power-Peakload-Week/Month/Quarter/Year-Futures.

Such futures come to an end with physical delivery of the whole quantity of electric energy for the entire period of the contract. Calculated in the last trading day (for week futures) and two exchange days before the period of delivery for the months futures is an 'ending price' for the futures. Usually this is the last price at closure of the trade in such futures. The buyer of a futures contract is obliged to receive the entire contracted quantity of electric energy for the whole period of the contract and to pay it at the ending price. The seller of the futures contract is obliged to deliver the contracted electric energy at constant parameters for each day and hour of the period of supply. Generally the contracts make provision for delivery of 1 MWh of electricity per each astronomical hour of the period of supply.

Financial futures admitted for trading are for the territories of Germany/ Austria, France and Italy:

●For the territory of Germany and Austria:

[8] The index is calculated on a daily and monthly basis for the territory of Germany and Austria.

- Financial futures on the Phelix index for base load (daily, weekend, weekly, monthly, quarterly and yearly) – Phelix-Base-Day/Weekend/Week/Month/Quarter/ Year-Futures;

- Financial futures on the Phelix index for peak load (daily, weekend, weekly, monthly, quarterly and yearly) – Phelix-Peak-Day/Weekend/Week/Month/Quarter/ Year-Futures;

- Financial futures on the Phelix index without peak load (monthly, quarterly and yearly) – Phelix-Off-Peak-Month/Quarter/Year-Futures.

●For the territory of France:

- French financial futures for base load (weekly, monthly, quarterly and yearly) – French-Base-Week/Month/Quarter/Year-Futures;

- French financial futures for peak load (weekly, monthly, quarterly and yearly) – French-Peak-Week/Month/Quarter/Year-Futures.

●For the territory of Italy:

- Italian financial futures for base load (weekly, monthly, quarterly and yearly) – Italian-Base-Week/Month/Quarter/Year-Futures;

- Italian financial futures for peak load (weekly, monthly, quarterly and yearly) – Italian-Peak-Week/Month/Quarter/Year-Futures.

Starting February 2015 French and Italian futures will be released for the days and for the weekend, as well as financial futures for the territories of Spain and Switzerland.

The ending price for financial futures is determined on the calculation after a particular index which averages the prices from auctions for each hour of the day/night on the cash market 'day forward' per each discrete market territory. Usually, prices are determined for base load, for peak load and for off-peak load, respectively. Ending of financial futures takes place only with equalization of the position with payment, i.e. there *is no physical delivery* of electric energy here. On maturity day the buyer of the financial futures is obliged to pay the difference between futures price and the fixed lower ending price. Where the ending price is higher than the futures price the difference is then paid by the seller of the futures contract. Such payment shall be effected until two days after maturity of clearing.

Options are traded only on the territory of Germany and Austria – they are based on the PHELIX index with a possible term of one month, three months, one year. *Types of options* – they are European type, which means that options are exercised on the last day for trading only.

In this type of term transactions a right is being bought. Rights are two types: in the case of Call-option the right is 'to buy' at the price of exercise and in the case of Put-option the right is 'to sell' at exercise price.

Underlying asset – the buyer of the call option is entitled to receive at the option exercise price in the last day for trading a long position in a year PHELIX financial futures. For example, if the year option is for 2014 it expires in December and is transformed into a yearly financial futures for the next year. The seller of the call option receives, when exercising the option, a short option in the same futures.

The buyer of a put option is entitled to receive a short position in respective futures at the option exercise price on the last trading day. The seller of a put option receives, when exercising, a long position in the respective futures.

Option Premium – this is the exchange price, which is paid at buying the right. The seller of the right receives the premium on the very same day. [9]. All settlement accounts of option sellers and buyers are kept by the clearing and every evening after closure of the exchange the due settlements are executed.

Series of options – these are all call and put options on one and the same base asset with equal exercise prices and one and the same maturity period. Offered for the first trading day for each maturity period are at least three series with different exercise prices – one of them shall be 'cash', the second one - 'on money' and the third price must be 'out of money'.

Traded maturity periods – in the case of Phelix year options there are four possible contracts with possible maturity occurring in the end of each quarter of the current year:

- maturity at the end of March – *April* Phelix year option for base load (Phelix-Base-Year-Apr-Option);
- maturity at the end of June – *July* Phelix year option for base load (Phelix-Base-Year-Jul-Option);
- maturity at the end of September – *October* Phelix year option for base load (Phelix-Base-Year-Oct-Option);
- maturity at the end of December – *January* Phelix year option for base load (Phelix-Base-Year-Jan-Option).

Option exercise – such exercise shall only take place during the last day of trading at the time of the so-called 'Exercise phase'. The Exchange determines an exercise market price and publishes it at 14:00 hours before the exercise phase has started. Options that are 'cash' against the published price are exercised automatically.

In principle, term transactions are concluded between members of the clearing corporation. If the transaction is realized by a buyer or a seller who is not member of the clearing corporation the transaction then shall be conducted as a must by a member of the clearing corporation who has the obligation to bring the deal to an end. He stands as an intermediary in the transaction, i.e. as buyer vis-à-vis the seller of the electric energy and as seller vis-à-vis the buyer of electric energy. Guaranteed thus is the liquidity of the transaction and the fact that buyer and seller will carry out the assumed commitments under the transaction made therein.

Orders for term transactions are limited and unlimited. Unlimited orders are two types: *valid until cancellation* and *valid until expiration of the term*. Where

[9] In 2014 r. Derivatives on 1570 TWh, were sold, i.e. this market is about 35 times larger than the annual production in Bulgaria.

orders have remained non-executed for the day after the end of the trading period they are deleted from the System of EEX.

Limited orders are with the same restrictions validity wise and they can be fed during the entire time of trading. Also used are combined orders – time spread, i.e. a simultaneous purchase and sale of futures contracts for one and the same product but with different time of maturity.

Transactions made on the exchange are recorded under internal accounts that are divided into personal, of clients and of market-makers. For each participant in the trade there will be opened: two personal position accounts, one client account and two market-maker accounts. Entered in the personal position accounts are transactions made for their own account. Entered in the client accounts are transactions made on behalf and for the account of the respective client. Accounts are kept gross, i.e. listed simultaneously therein are the short and long positions taken. The accounts of market-makers are kept net, i.e. each position can be either a short or a long one, yet the two cannot be entered at one and the same time.

The process of transformation from state monopoly in the energy sector to a free efficient market ends when players in the trade begin to conclude transactions among themselves under transparent exchange rules and guaranteed equality for all players in the market. Such market shall also make provision for the conclusion of term transactions (futures and options) under a perfect regulation, because, with an appropriate selection of term transactions the interest of each participant can be defended in the trade of electric energy against a risk unacceptable therefor.

I have to mention in conclusion that the European Energy Exchange EEX is indeed providing a perfect market mechanism for determining the exchange prices of primary-energy sources in Europe and in particular – of electric energy. It is also evident that only the territory of Bulgaria is staying out of the European Energy Exchange market which, to my opinion, does not deserve high esteem.

Main conclusions and recommendations on the situation of the electricity market in Bulgaria

The transformation of Bulgarian electricity market from state monopoly to a free efficient market is just beginning. Despite the text on the site of the Bulgarian Electricity System Operator EAD: '…. *Finalized on 4 February 2014 was the last phase of the process of separation of National Electric Company EAD from Electricity System Operator EAD in accordance with the requirements of the third liberalization package. This was the last step of meeting the requirements of Directive 2009/72/EC and the national legislation.*' The separation of the system operator is an important step in this process, yet this is only the beginning and not a last step. What is more, such separation does not mean that severance has been achieved of production from supply of electric energy, as required by the quoted directive.

In practice the role of NEK-EAD as a 'public service provider' is an obstacle to the liberalization of the Bulgarian energy market which shall ensure equality for

all players in the trade in electric energy. On the contrary, players on the Bulgarian electricity market are permanently disadvantaged (reported were differences of 120% from the average price) and this will have just one result – growth in the calculations of the company and affirmation by SEWRC of new higher prices of electric energy for end consumers. Un our opinion the activity of NEK-EAD as a 'public provider' of electric energy must be terminated because practice thus far has shown that NEK accumulates deficits and embedded disproportions it is unable to cover with own revenues and logically there follows a new proposal for higher prices to end consumers. *Public interest must be defended by the government (probably with add-ons again to the price for end consumers), but under a clear development strategy for the energy sector*. Such add-ons must be accumulated in /the state budget and the gathered funds shall be used to establish appropriate incentives for development of the branch. Besides, NEK is both a producer and supplier of electric energy and this again is contrary to the requirements of the directive.

The mere fact that the created electric energy exchange contains the term 'independent' in its name gives rise to reasonable doubts concerning the independence of this market. It is written in the SEWRC decision that … '*Bulgarian Independent Energy Exchange EAD' will use the technical and material resources of Electricity System Operator EAD* – I think that when a company uses the material resources of another one it cannot be independent. Furthermore, traded on the exchange in 2014 ought to have been 4 TWh and this quantity shall be doubled by 2018. This shows that it is envisaged to sell initially on the exchange less than 10% of the electric energy generated and traded in Bulgaria (4 TWh are envisaged for the exchange out of 46 for 2014). This quantity is sold within one day on the European Energy Exchange. In my opinion the Bulgarian exchange created lacks the characteristics of a working exchange market and it would be better to discontinue such practice.

In Bulgaria public interest in electric energy from renewable energy sources is actually compromised in Bulgaria because its purchase price has been fixed too high and in practice the difference is paid by all consumers of electricity in the country. This electric energy should have a higher purchase price in order to create incentives for investment in its generation, but the entire burden shall not be conveyed onto the end consumer. It is normal to have this difference compensated in full or in part by the government. Eventually it is the government that makes the energy policy and it can create additional incentives either from the sale of harmful emissions, from implemented measures towards enhancement of energy efficiency, etc. or to simply plan these costs in the budget.

Bulgaria's electricity market must accede to the European Energy Exchange by organizing a cash and term market after its model. The cash market will determine a wholesale price of electric energy in accordance with the momentary demand and supply on the Bulgarian market. The term market will provide futures with physical delivery to players in the trade and afterwards – probably financial futures as well, so that each player could choose an additional protection for the occupied position.

What should the 'fair', 'normal' or 'ideal' price of electric energy be? Are there rules of determining such price at all? To expect 'cheap' energy at a time when electric energy markets are facing considerable difficulties is unrealistic – to put it mildly. World economy growth, the number of population and industrialization necessitate an increase in the energy dependence on a global scale. These processes will not go past Bulgarian market either.

In reality, '… *a fair price of electric energy can only be achieved through a large-scale democratic meeting of supply with demand in transparent markets*' (EPEX-SPOT, 2013, p. 19). Since 2001 to date the wholesale price of electric energy for the market Germany and Austria of the European Energy Exchange has been fluctuating within approximately one and the same limits (3 to 5 Eurocents per KWh), yet the retail price, i.e. the price for end consumers has risen almost two times (from 14 to 27 Eurocents per KWh). Included in the retail price are the fees for transmission of the electric energy, taxes and other public expenses. Here, most generally, determined as fair price is the exchange price because it must be solely the result of the momentary ratio between demand and supply of electric energy under transparent rules and guaranteed competition. What else shall be paid by end consumers on the exchange price ought to be decided by the government in consideration of the objectives and tasks of the implemented energy policy.

Despite the fact that Germany and France are in one common energy market in France allegedly regulated prices for end consumers are lower than those in Germany, while electric energy bills for the households are comparable as a burden. Yet the lower prices of electric energy do not stimulate energy efficiency and in France electricity consumption is more than two times higher compared to Germany. In other words, except that the price must be a market one, it shall also stimulate towards reduction in consumption and a growing energy efficiency.

It is said in the SEWRC Annual Report for the European Commission from July 2014 that '*…the income available to Bulgarian households is the lowest compared to the rest of the EU countries. Although the price of electric energy for the households is also the lowest, the share of population's income used to pay electric energy bills is considerably higher than the average one for the EU*' (p. 31).

In order to have this Bulgarian paradox discontinued of paying the lowest price for electric energy in Europe and at the very same time such price to be the greatest burden for Bulgarian households *we must join the European Energy Exchange as soon as possible* and to see generated electricity sold in a transparent manner. NEK obligations as a public supplier and the agreed rights of other players in the trade in the Bulgarian market shall be regulated and compensated by the government beyond any market relations. Most probably this again will be tax and non-tax burdens in the price for end consumers yet the state must intervene on its part in shouldering the burdens in our energy system as all this had happened with the collaboration or inaction of the ruling government institutions. Furthermore, starting January 2015 there are monthly, quarterly and yearly futures sold in the European Energy Exchange for electric energy with base load for the market of Greece and Rumania.

Should Bulgaria decide to join the European Energy Exchange this will be a sure sign that new disproportions will not accumulate and bills of consumers will become transparent and predictable. Otherwise the territory of Bulgaria will remain an isolated and non-transparent electric energy market with bad consequences for all of us.

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